

# Laboratory Operations Model

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Soudan Operations  
Review

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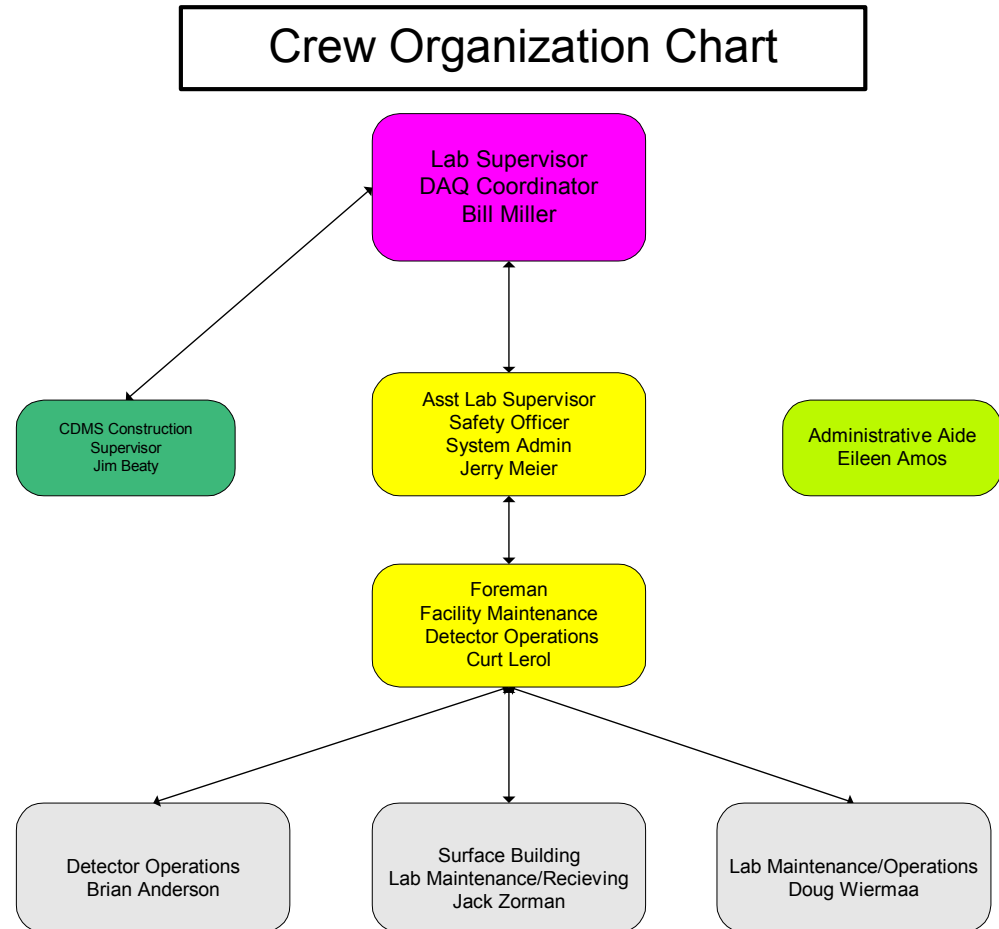
# Outline

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- Experimental requirements summary
- Staffing plan and assignment matrix outline
- DNR operations costs
  - > Hoisting, power, labor, admin ...
- Price breakdown and functionality breakpoints - esp. labor

# Operations Crew - Baseline

- Starting in September the crew will be reduced to its proposed operations levels
- The crew will maintain both detectors, the facility, and man off-hours support for both detectors
- Same crew Gina talked about yesterday
  - > 6.75 op's + 1 CDMS



# MINOS Needs

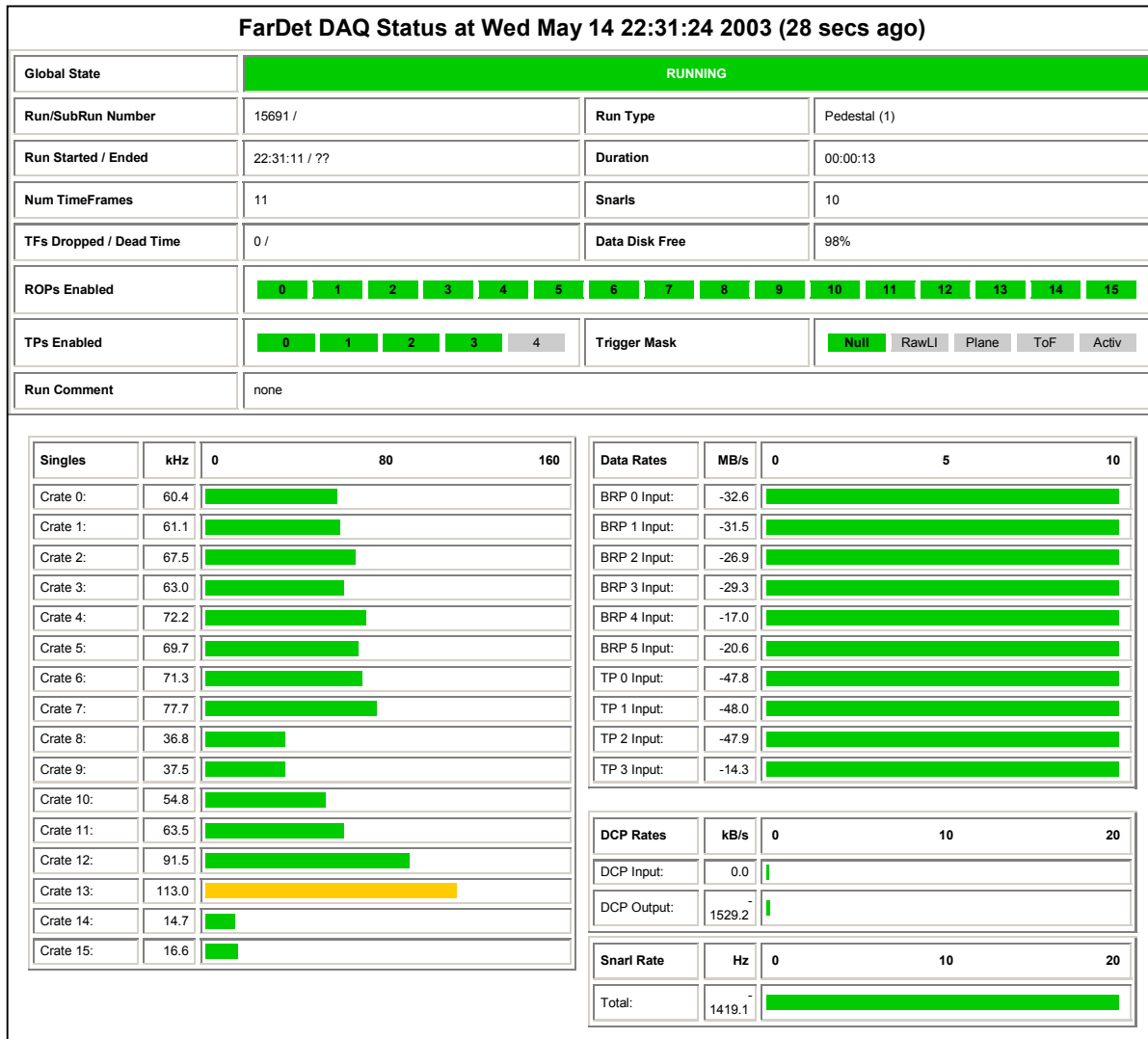
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- MINOS detector operations needs
  - > No failure modes that require 24/7 access for equipment protection or safety
  - > Live time drives requirements
    - Less crucial before the beam much more so later
  - > Local DAQ coordinator & DAQ hardware expert
  - > LAN/telecomm requirements for remote control
    - Days worth of data buffering underground
  - > Control from underground, surface, FNAL, remote...
  - > Some local on-call physicist support anticipated
  - > FNAL-based data-processing operations

# MINOS Control Model

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- Primary control room at FNAL (see Cat)
  - > Unifies beam, near detector, far detector
    - Primary long term solution in late FY04
  - > Building ND/beam in FY04 - focus naturally here at Fermilab
    - Very useful to run shifts were the people are even in early FY04
- Primary control room underground at Soudan
  - > For normal underground shifts
  - > Detector maintenance / "access"
- Auxiliary control room on surface at Soudan
  - > 2 PCs, desk, phone - could be surface building or Hill house
- Remote control room in UK
  - > They are naturally awake when we're not!
  - > Not defined; most UK groups are experts



# MINOS Shifts for FY04

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- Preliminary - not vetted with collaboration
  - > Run weekday shifts at Soudan
    - One recurring expert
      - 1 in 3 weeks @ Soudan - 3 experts
    - One casual shifter
    - Expert on call for crew's 2<sup>nd</sup> if MINOS access required
    - Reduced coverage on weekends
  - > Run weekend and off shifts at Fermilab/RAL
    - One recurring expert
    - One casual shifter
  - > Manpower requirements
    - Rotating army of 10 experts
      - 7 FNAL & 3 Soudan
      - Part of graduate student service requirement
    - 1 FTE of non-expert shifters

# CDMS Needs

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- 24/7 underground access with on call cryogenic technicians in case of cryogenic failure for equipment protection
- 24/7 on-site physicist presence requirement for experimental operations
- Surface network/surface office for data collection and primary control room
- Local analysis and data processing
- Clean room space on surface



# Baseline Physicist Summary

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- CDS physicists 24/7  
[collaboration endorsed]
  - Two people; one always call when not on shift for underground support
- MINOS physicists 24/5 (?)  
[address at June collaboration meeting]
  - Two people; one casual shifter; one shift expert on rotation for underground weekday on-call support

# Hit the Cost Drivers Again

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- DNR
  - > Electric, Labor, Hoisting, Rent, Admin
- UMN Labor
  - > SWF
  - > On-call/call in
- Both require an operations model

# Access/On-Call Ground Rules

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- Two people required for underground safety
- 24/7 guaranteed on-call support requires
  - › DNR hoistman on-call rate is 25% of active rate
  - › DNR electrician goes on-call if hoistman called active
  - › UMN on-demand on-call rate provisionally \$2/hr (base) across classes and bargaining groups
    - 4-hour minimum call in block - OT or 1.5X comp time
    - Some UMN/state mandated rest periods between successive shifts
      - Once called someone else becomes must be next on-call employee; depending on time & duration may be furloughed on succeeding scheduled shift
  - › UMN employees get 24 vacation days per year
  - › Exempt employees (Bill/Jerry) can be used in more fluid and continuous roles - given most demanding single roles for increased continuity and oversight
    - Gets on-call rate if near-site presence mandated

# My Guidelines

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- Any mission critical role requires
  - > A lead person (up to 1 FTE)
  - > A backup person for on-call relief (fractional FTE)
  - > Coverage for sick/vacation (0.2 FTE)
  - > Usually means 3 people with variable fractional assignments
  - > In a crew of 7 technical staff, everyone does about half of all the jobs
- Less critical roles require at least 2 cross trained crew members for vacation/sick coverage
- Need to have 3 crew of underground staffing per shift for basic coverage

# Labor Defined in a Matrix

- Mission critical functions
  - Base operations
    - 3+ FTE
  - System/network
    - 1 FTE
  - MINOS systems
    - 1.6 FTE
  - CDMS Cryo
    - 1 FTE
  - Roles 6 -> 7+  
(w/ vacation/sick coverage)
- On-call with two modes
  - 2 avail w/1 on call + phys
  - 3 avail w/2 on call
- Matrix details available offline but not yet frozen and implies some reassignments

Supervision	1.2	Bill ++
foreman	0.25	crew
Safety officer	0.4	Crew+
Facility ops	0.25	Crew++
Housing admin	0.25	Eileen+
Sanitary/Janitor	0.25	Crew++
Receiving/shipping/purch	0.25	Eileen/crew
surface ops	0.25	Crew+
Billing/accounting	0.25	Eileen/Bill
Network/telecomm	0.25	Jerry ++
System admin	0.75	Jerry ++
Elec Tech		Crew+
Mech Tech		Crew+++
Machinist		Crew++
Welder		Crew++
Design/drafting		Beaty+
Driver/operator		Crew++
Recept/switchboard		Eileen++
DNR coordination		Bill++
MINOS DAQC	1.2	Bill +
MINOS Electronics	0.4	Crew++
CDMS lead tech	1	Beaty+
On-call Cryo		Crew+++
On-call MINOS		Crew+++
MINOS DAQ HW		Jerry +

# On-Call

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- If phys 24/5 (A)
  - › Need 3 crew available for on call each weekend and 2 available for on call on any weeknight night
- If phys 24/7 (B)
  - › Need 2 crew available for on call each off-hour and 1 on call on any given night
- Assume continuous on-call blocks 10 days or less
- Assume one call-in every other week
  - › CDMS model has 1 call-in per month
  - › Assume MINOS is similar

# On-call pool levels

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- Mission critical tasks imply 2 FTE of on-call beyond detector access pool
- Underground access on-call requires

(A) With 5 crew pool (current plan) - 7.75 total FTE

- Crew gets 2 weeks in 5 available for vacation and/or not potentially on call

(B) With 5 crew pool - 7.75 total FTE

- Crew gets 3 weeks in 5 available for vacation and/or not potentially on call

(B) With 4 crew pool - 6.75 total FTE

- Crew gets 2 weeks in 4 available for vacation and/or not potentially on call
- Only 3 crew some days - not enough for an emergency cryo run + underground + vacation + sick

# UMN Labor

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- Loaded costs for 7.75 FTE (rolled/Beaty off)
  - > \$576,027
- Loaded costs for 6.75 FTE (rolled/Beaty off)
  - > \$511,603
- On-call costs
  - > \$30,663 (A)
  - > \$20,101 (B)
- 1 call in every 2 weeks (if all OT & no comp)
  - > \$8,360 (A)
  - > \$5,573 (B)

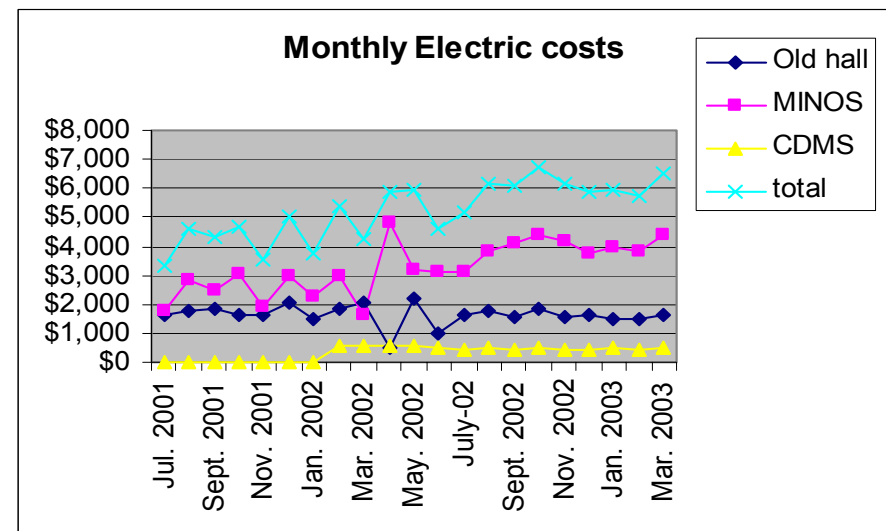


# DNR in more detail (I)

- Average and extrapolated power costs by meter per month with updated IDC

	Old hall	MINOS	CDMS
Average	\$1,600	\$4,100	\$485
Opr Estimate	\$1,600	\$6,552	\$650

Annual costs      \$109,510 + IDC



# DNR in more detail (II)

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- Rent for caverns
  - > \$20k for MINOS hall
  - > \$12k for CDMS
  - > \$8k for rest of old hall
  - > No IDC for rent
- Administrative support
  - > 30% reduction in work load
  - > \$18,720 + IDC (DNR/WHM estimate)

# DNR in more detail (III)

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- Hoist trips
  - > Historic data back to earliest days
  - > Soudan 2 used ~900 per year
  - > Expect roughly ~1200 for MINOS+CDMS+on call
- Safety equipment, cage maint, supplies well baselined from past operations
- DNR labor fixed by 5/10 access requirements & on-call requirements
- Nothing other than reducing hoisting and call in time will significantly reduce these costs

- Gina covered this
- Largely fixed
- Minor adjustments assumed
  - > 6 phone lines -> 4
  - > Lower long distance charges
  - > Lights off 2<sup>nd</sup> shift...
- Not much fat without reducing basic functionality

# Summary

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- Labor requirements driven by experimental and facility operations
  - > 24/7 two people on call for underground access
  - > 24/7 on call for sys/network admin
  - > MINOS DAQ coordinator on call
  - > Minimal redundancy for sick/emergency
    - Matrixed roles for operations staff
  - > Staff of 7 techs OK; staff of 6 requires MINOS to add more local physicists support and leaves little margin
    - 6 assumes no more than two people sick or vacation on any given week - not reasonable, say, over the holidays